OISD - STD - 118

LAYOUTS FOR OIL AND GAS INSTALLATION

सत्यमेव जयते

तेल उद्योग सुरक्षा निदेशालय
Oil Industry Safety Directorate
ISO 9001:2015 certified

Inception	***Nov 1988***
Rev 3	***June 2025***

-Shivendra Singh Parihar

Brief Summary

Description	Description
Member participation	21 members from 13 organization

NAME	DESIGNATION	ORGANISATION
LEADER		
Amitabh Kishore	Senior General Manager	Engineers India limited
MEMBERS		
Papini Kiran Kumar	General Manager (HSE), Marketing	Indian Oil Corp. Ltd.
Manjunath Shastry THM	General Manager (Maintenance)	Mangalore Refinery and Petrochemicals Ltd.
Ajit Kumar Jha	General Manager (O&M)	GAIL (India) Ltd.
Sukhbir Singh	General Manager (P)	Oil and Natural Gas Corporation
Sunil Dhakate	General Manager (Cryogenic Project)	Bharat Petroleum Corp. Ltd.
Navratan Sharma	Chief HSE Officer	Vedanta Cairn Oil & Gas
Dinesh Kumar	Joint General Manager	Nayara Energy Ltd.
Naveen Lal	General Manager (Civil), BPREP	Bharat Petroleum Corp. Ltd.
YVNR Trinadh	General Manager - Plant, Kochi LPG Terminal	Indian Oil Corp. Ltd.
Utpal Deka	General Manager (PE&S)	Oil India Ltd.
M. Elamaran	Deputy General Manager (TS)	Indian Oil Corp. Ltd.
Prashanthi S. Bhupathi	Head- Process Safety	Reliance Industries Limited
Rajesh B K	Chief Manager	Bharat Petroleum Corp. Ltd.
Saravanan G	Deputy General Manager Engineering	HPCL Mittal Energy Ltd.
Shivank Bhola Nath	Sr. Manager Technical	Petronet LNG Ltd.
Dev Kumar Varshney	Consultant E&P	Oil Industry Safety Directorate (Up to June 2024)
Rajnish Vaid	Jt. Director (MO-POL)	Oil Industry Safety Directorate
Navneet Kumar Sharma	Joint Director (PL)	Oil Industry Safety Directorate

Member Co-Ordinator: Shivendra Singh (OISD)
Vivek Prakash (OISD)

Scope

This document lays down the minimum requirements of layout within the plant boundary/ pipeline installations for all midstream, downstream and upstream (except offshore installations) sectors of the Oil and Gas Industry.
The requirement of green belt/ buffer zone beyond the plant boundary is outside the scope of this standard. Such provisions should be considered based on local environmental/ security requirements/ requirements of applicable statutory bodies.
This standard does not apply in petroleum installations and upstream facilities with aggregate storage capacity of less than 1000 KL. At such locations inter distances shall be as per risk assessment.

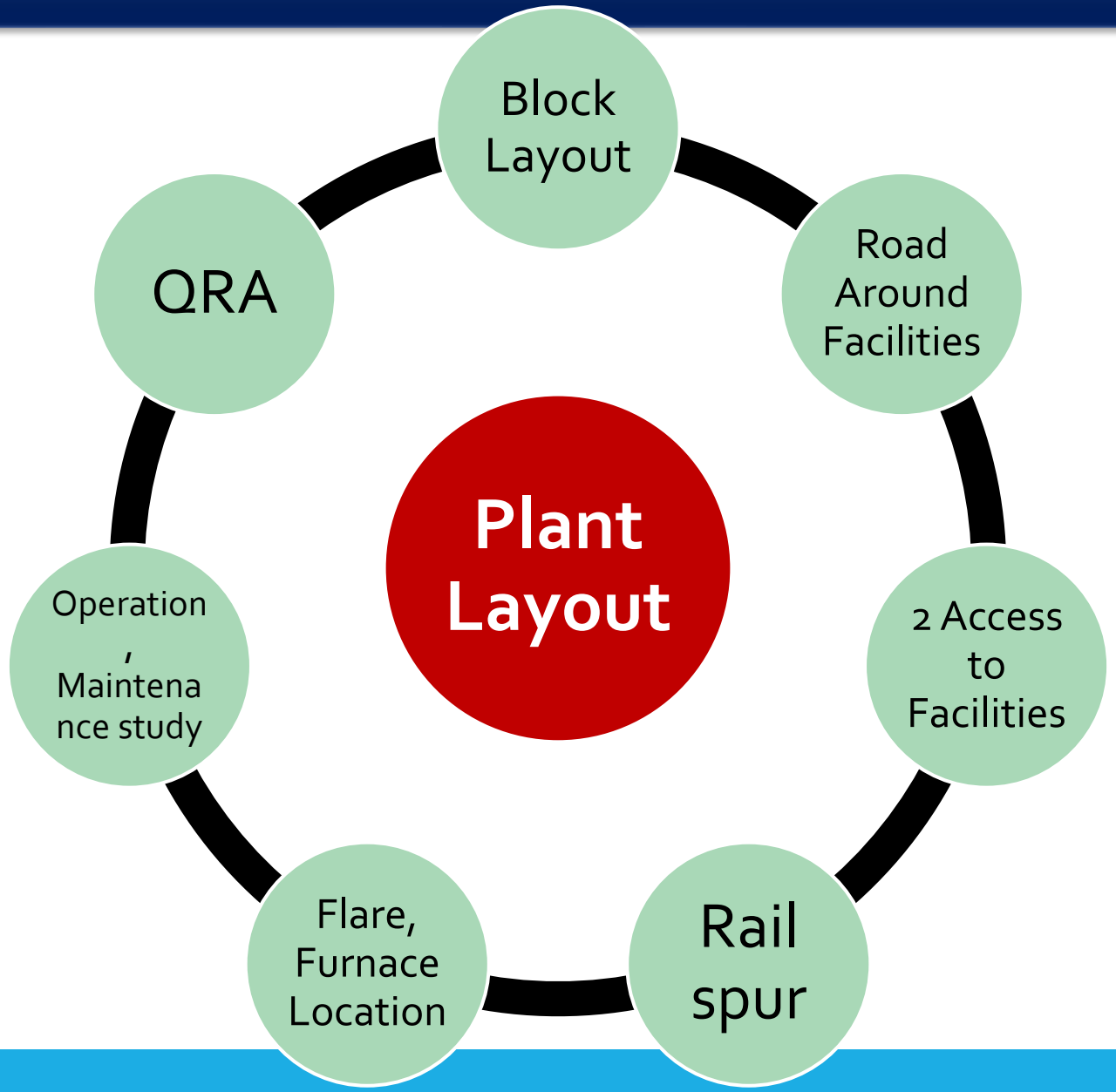
Non Compliance

If an entity has laid, built, constructed, expanded the Installation based on some other standard or is not meeting the requirements specified in this standard, the entity shall carry out a detailed Quantitative Risk Analysis (QRA) of its infrastructure and the entity shall thereafter take approval from its highest decision-making body or its board for non-conformities and mitigation measures. The entity's Board approval along with the compliance report, gap analysis, mitigation measures and implementation schedule shall be submitted to the OISD.

Definitions Added

- Classified Road
- Non Classified Road
- Mounded Bullets
- Non Plant Building
- Plant Building
- Utilities
- Refrigerated Tank System
- Day Tanks
- LNG Terminal Facility

Plant Layout Philosophy



Layout of Block/ Facilities

- Units in Single Block
- Control Room Location
- Overhead power transmission lines shall not pass over the installation
- Cooling Tower Location
- In undulating terrain, process units should be located at higher elevation as compared to storage tanks
- Flare should be located upwind of process units and hydrocarbon storage. The area around flare should be paved.
- Smoking shall not be permitted inside the installation.
- Oily water sewer (OWS)/ Contaminated rain water sewer (CRWS) pit (open type)/ oil catcher shall be located at a distance not less than 30 m from fired heater/ any fired equipment. If the OWS/ CRWS pit is covered with vent to safe location, the minimum separation distance shall be 15m.

Inter distances Between Block/ Facilities

- ✓ Table-1 shall be referred.
- ✓ There are total 24 types of facilities considered.
- ✓ In this revision few new type of facilities added (LNG Tanks, Excluded petroleum storage, Utilities plants, DWST tanks, etc.)

Highlights:

- Total 29 notes to table.
- Sterile Radius of flare can be reduced up to 60M (refer N7), based on thermal radiation calculation.

"Any tank, distillation column, pump-house or any facility for the refining, cracking, reforming, blending, storage or handling of petroleum or liquefied petroleum gas, other than knockout drum and condensate recovery pump attached to flare, shall be located at least 90 M away from flare. No manned permanent structure/ shelter / storage of flammable materials/ open drains shall be allowed in the sterile radius for flare. Suitable thermal radiation study for the flare as per API-521 shall be done for determining the actual sterile subject to conforming the following conditions"

Inter distances Between Block/ Facilities

- Fire water storage (other than steel tank) can be located within 90 M radius from flare, provided the same is outside the impact zone of fire fireball.
- A captive power plant is considered a process unit for inter-distance consideration.
- Inter distances covered related to polymer warehouses, excluded petroleum storage etc.
- Revised OISD-STD-118 consists 12 inter-distance tables, which covers all kind of facilities. Separate tables are given for process plants, tank farms, POL location, LPG marketing Locations, Upstream sector and pipeline locations.
- These inter-distance tables are consistent with tables given in various other standards (OISD-STD-144, 244, 141, etc.).

Layout of Process Units

- While planning unit layout Safety, Operation, Maintenance ease shall be considered.
- No trenches, pits (open/ closed) and open drain funnel shall be located within 15 Meters from furnace walls.
- Air fin coolers should be installed above the pipe rack/ technological structures/ independent structure. Pumps handling hydrocarbons above the temperature of 230 °C or C_4 and Lighter ends should not be installed underneath the air fin coolers. If unavoidable, then blind floor shall be provided beneath the air fin cooler.
- Table-2 shall be followed for inter-distances of equipment inside process unit.

LAYOUT OF STORAGE TANKS

- Dyke Enclosure Capacity
  - ✓ 120000 m^3 for Floating Roof Tank
  - ✓ 60000 m^3 for Fixed Roof Tank
- Fixed cum floating roof tanks shall be treated as fixed roof tanks.
- If a group of tanks contain both fixed and floating roof tanks, then it shall be treated as a group of fixed roof tanks for the purpose of above limits.
- In case of Earthen Dyke ".6M top flat section shall be provided with stone/ PCC/ Brick pitching on side slopes and top of dyke".
- Dyke height more than 2M is allowed with approval from licensing authority with following special arrangements:

LAYOUT OF STORAGE TANKS (Cont.)

- ✓ Monitors on raised platforms (outside the dyke), if required, shall be provided so that the trajectory of the monitors is not restricted.
- ✓ All the tanks inside such dyke shall be provided with water spray system, irrespective of the tank diameter.
- ✓ Tank farm area shall be covered through CCTV surveillance system and the same shall be continuously monitored.
- ✓ Suitable arrangements shall be made all around the tank farm such that the full tank height is visible from outside dyke.

- Dyke wall shall be an independent structure and no other structure shall be provide/ supported on dyke wall.

Table 3,4,5 shall be referred for the Safety Inter Distance of tankfarm

Grouping of Storage Tanks

- Grouping of Class A, B, and C petroleum
- Storage of Excluded class petroleum

LAYOUT OF C4 & LIGHTER ENDS (e.g. LPG, Propane, Butane, Propylene etc.) FACILITIES

- This is same as stipulations for LPG facilities in previous revision, Other products have been added.
- Table-6 & Table-7. shall be used for Safety Inter distances

Inter Distance Tables

Table-1	Minimum Separation Distances Between Blocks/ Facilities
Table-2	Minimum Separation Distances Between Equipment Within Process Unit
Table-3	Minimum Separation Distances Between Tank & Offsite Facilities – (For Large Installations)
Table-4	Minimum Separation Distances Between Storage Tanks Within a Dyke
Table-5	Minimum Separation Distances Between Tanks/ Offsite Facilities – (For Small Installations)
Table-6	Minimum Separation Distances for LPG Facilities
Table-7	Minimum Separation Distances Between C_4 & Lighter Ends Storage Vessels and Boundary Wall/ Group of Buildings not Associated with C_4 & Lighter Ends Facilities
Table-8	Minimum Separation Distances for E&P Production Installations (CBM, CTF, GCP, GCS, GGS, etc.)
Table-9	Minimum Separation Distances Between Facilities in Natural Gas Pipeline Installation
Table-10	Minimum Separation Distances for Liquid Hydrocarbon Pipeline Installation Facilities
Table-11	Minimum Separation Distances for Various Station Facilities for LPG Pipeline Installation
Table-12	Minimum Separation for Various Facilities for POL Marketing Installation

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